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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/820,272

04/08/2004

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105-63 DIV

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT

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1792

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/820,272	<b>Applicant(s)</b> SUEMASU ET AL.	
	<b>Examiner</b> Katherine A. Bareford	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The amendment of May 19, 2008 has been received and entered. With the entry of the amendment, claims 1-8 are canceled and new claims 9-22 are pending for examination.

#### *Specification*

2. The objection to the disclosure because at page 1, in the reference to 10/247,264, it should be clarified that the parent application is now U.S. Patent No. 6,743,499 is withdrawn due to the clarification in the specification by the amendment of May 19, 2008..

#### *Double Patenting*

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 9-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4-7, 10, 12 and 13 of copending Application No. 11/739,575. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of 11/739,575 provide all the features of claims 9-15 of the present application, including forming the hole partway through the substrate (claim 1 of '575), forming a metal layer on an inner surface of the hole (claims 6,7 of '575), filling the hole with molten metal (claims 2, 4, 5 of '575), and removing a portion of the substrate (claim 1 of '575) except the solidifying (present claims 9, 11) and bump formation (present claims 14, 15), however, it would have been obvious that solidification would occur for use of the product, and the bump formation would have been suggested by the desire to form a bump (claim 10 of '575). While the claims of 11/739,575 also provides other features, these are not prevented by the wording of the present claims of this application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

5. In the amendment of May 19, 2008, applicant notes the provisional obviousness-type double patenting rejection and refers to filing a terminal disclaimer in the later pending application. As a result, the provisional rejection above is maintained.

*Claim Rejections - 35 USC § 112*

6. The rejection of claims 1-5 and 8 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is withdrawn due to the cancellation of the claims in the amendment of May 19, 2008.

*Claim Rejections - 35 USC § 102*

7. The rejection of claims 1 and 4 under 35 U.S.C. 102(b) as being anticipated by Schneble, Jr. et al (US 3628999) is withdrawn due to the amendment of May 19, 2008 cancelling the claims.

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the

various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 9-12 and 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneble, Jr. et al (US 3628999) in view of Locke et al (US 5425751).

Claims 9, 16: Schneble teaches a metal filling method. Column 4, lines 40-75. A hole is formed in a workpiece extending from a first surface towards and opposite surface of a workpiece. Column 4, lines 55-60 (holes 28) and figure 1E. The hole extends "into" base 10, and is not required to pass entirely through the substrate (base). Column 4, lines 55-50 and Figure 1. Then a metal layer is formed on at least an inner surface of one end of the hole. Column 4, lines 55-65 (deposit 30) and figure 1F. Then a third step of filling a molten metal into the fine hole is provided. Column 4, lines 65-75, column 5, lines 25-30 (solder would be metal) and Figure 1H (see 34). These form conductive passageways (connectors). Column 2, lines 40-50.

Claim 10, 17: the hole is filled by immersing the workpiece in molten metal. Column 2, lines 1-10, column 4, lines 65-75, column 5, lines 20-60 (dipping in a molten solder bath).

Claim 12, 19: the workpiece comprises a substrate (base 10). Figure 1E and column 4, lines 55-60.

Claims 14, 15, 21, 22: the solder metal comprises an external section which protrudes from the first surface of the workpiece, forming a "bump" shape. Figure 1H and column 4, lines 70-75.

Schneble teaches all the features of these claims except (1) solidifying the metal (claim 9, 11, 16, 18), (2) removing part of the workpiece to expose the solidified metal through the opposite side of the workpiece (claim 9), (3) that the hole is a through hole that extends through the workpiece (claim 16), (4) that the metal filling method further comprises closing the opening of the through holes and then opening the closed opening (claim 16), (5) and the closing of the opening using sealing material (claim 20).

Locke teaches that it is well known to provide connector through holes in an article where the holes are to be filled with metal. Column 4, lines 5-20. Locke teaches that it is known to form the connectors by providing a via or hole 82 that extends partially into a substrate (layer 80) of a workpiece. Figure 6a and column 8, lines 20-30. Then the hole is plated to fill with conductor metals. Figure 6b and column 8, lines 25-35. Then the substrate 80 is partially removed to expose the metal in the hole by a process such as etching. Figure 6c and column 8, lines 35-40. Solder can be plated into the holes. Column 8, lines 40-45. Locke also teaches that it is known to form the connectors by providing a through hole 58 through a substrate (sheet 56) and to close/block/seal the hole using a layer 54 (copper foil). Figure 5a and column 7, lines

40-47. Then the hole is plated to fill with conductor metals. Column 7, lines 45-55 and figure 5b. Then the layer 54 is removed to expose the metal through the opening of the through hole. Figure 5c and column 7, lines 54-60.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Schneble to remove the workpiece from the molten metal bath and solidify the molten metal, in order to have a desirable treated circuit board for use, because Schneble teaches the formation of circuit boards, to dip the workpiece in molten solder, and demonstrates the result of a plated article, indicating that the article must be removed from the molten solder bath for final use and furthermore the molten solder would solidify after removed from the bath, because it was no longer heated. (2) It further would have been obvious to modify Schneble to remove part of the workpiece to expose the solidified metal through to the opposite side of the workpiece as suggested by Locke in order to provide a desirable connector, because Schneble teaches to provide holes into the substrate to be filled with metal to form connectors and Locke teaches that when providing connector holes, it is known to provide them into a substrate of a workpiece and then, after filling, to removing the substrate area to expose the connector to provide a connector through the entire workpiece. (3) (4) (5) It further would have been obvious to modify Scheble to provide a through hole that extends through the entire workpiece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling and then to open the closed opening by removing the sealing layer as suggested by Locke in order to provide



desirable connectors, because Schneble teaches to provide through holes into the substrate and Locke teaches that when providing connector holes, it is known to provide them as a through hole that extends through the entire workpiece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling, and then to open the closed opening by removing the sealing layer. It would have been obvious to that the sealing layer would be provided either before or after hole formation with an expectation of equivalent results as long as it was provided before the filling of the holes, because the purpose of the sealing layer is to block the opening during filling. Also note *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results) (MPEP 2144.04. IV. C).

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schneble in view of Locke as applied to claims 9-12 and 14-22 above, and further in view of Chang et al (US 5753529).

Schneble in view of Locke teaches all the features of this claim except removing the part of the workpiece by polishing.

However, Chang teaches at it is well known to remove portions of a workpiece to expose filled holes passing partway through the substrate (figures 6, 7) by either grinding, etching or CMP (chemical-mechanical polishing). Column 6, lines 9-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schneble in view of Locke to remove the portion of the workpiece by polishing as suggested by Chang with an expectation of desirable removal results, as Schneble teaches to remove a portion of the workpiece by etching, and Chang teaches that as well as etching, polishing methods can be desirably used to remove a portion of a workpiece to expose filled holes.

12. Sprietsma et al (US 6429383) also teaches using a sealing material when filling a through hole. See column 3, lines 35-65.

### *Response to Arguments*

13. Applicant's arguments with respect to claims 9-22 have been considered but are moot in view of the new ground(s) of rejection.

The new references to Locke and Chang have been provided as to the newly claimed features as discussed in the rejection above.

### *Conclusion*

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/  
Primary Examiner, Art Unit 1792